



**ONTARIO
CRIPPLED
CHILDREN'S
CENTRE**

**Symbol
Communication
Programme**

**Year End
Report
1974**

ONTARIO CRIPPLED CHILDREN'S CENTRE

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ABSTRACT

YEAR-END REPORT

ONTARIO MINISTRY OF EDUCATION CONTRACT

FOR THE

DEVELOPMENT OF SYMBOL DISPLAYS AND INTERFACES

During the period September 1973 to August 1974 the Ontario Crippled Children's Centre Symbol Communication Programme included development in the areas of symbol display and interface; 3 classroom programmes integrating symbol usage into the total educational programmes of twenty children; continued development of a symbol communication system for non-speaking physically-handicapped children; exploration of various methods of symbol instruction; initial work on development of a reading programme suited to the learning strengths of the symbol-using child; data collection, within Ontario Crippled Children's Centre, to record change in performance and to develop research testing tools; data collection, from other settings, to gain statistics re the population of physically-handicapped non-verbal children in Ontario and re the June 1974 population of known symbol users; development of recording, procedures, which would be appropriate for the Evaluation Study 1974-76; contributing to the introduction and extension of symbol programmes in other settings through lectures, four instructional workshops and development of a Teaching Guideline which included a dictionary of those symbols which appear on Ontario Crippled Children's Centre displays.

The children ranged in age from 5 years to 16 years and varied in their symbol experience from no experience to two years experience. In the Kindergarten class a wide range of symbol use was observed - ranging from "limited use and only upon direct request" to "a spontaneous and integral part of the child's relationship with others". In the Intermediate class, growth was observed in all children in the ability to communicate, the ability to assist others in clarifying a message and in the ability to question perceptively. Symbols served as both a substitute and supplement to speech, depending upon the needs of the child. In the advanced class, symbols were utilized fully in communication and in activities which encouraged classification of concepts, divergent-convergent processing and problem-solving. Interaction with peers and increased vocalization developed concurrently with increased facility with symbols.

In all classes, distinct objectives were established for the severely involved children: to produce the best telegraphic output and de-emphasize speed; to concentrate upon enabling the "listener" to comprehend; to supplement symbol output with body language in the form of gesture and eye communication.

In the area of display development, attention was directed toward completion of the two 400-symbol-interpersonal-displays for pointing children, designing the 512-symbol-display for non-pointing children and redesigning the "100 x 100" MK I electronic symbol display for non-pointing children so that it could be more easily manufactured and hence more readily available to children outside Ontario Crippled Children's Centre.

In the area of interface development eight interfaces were devised or improved. These included three types of hand-controlled joy sticks, a sliding switch, flat surface switches, a hand paddle, a head controlled light beam pointer and an eye-directed symbol display. Each interface was evaluated as to its advantages and disadvantages.

The results of the 1973-74 programme were encouraging in so far as development of the symbol system, children's learning and display development was concerned. Interface development remained the area of deepest concern. In spite of the eight interfaces developed, there is still no effective interface for the severely involved athetoid child. Because of the need for an increase of Rehabilitation Engineering and Therapy resources in this area, a separate interface project was proposed for 1975. It was also recommended that the main focus of the Ministry of Education Research be directed toward evaluation of the effectiveness of the symbol system as it was being taught in a variety of settings.

DIRECTOR'S REPORT

During 1974 the O.C.C.C. Symbol Communication programme has moved from an emphasis upon development of vocabularies and equipment, to an evaluation phase involving the directing of attention not only upon the O.C.C.C. School Symbol Programme, but upon the Canadian and American symbol programmes of 52 instructors in 35 settings including 160 children. The O.C.C.C. classroom programme continued to provide symbol instruction integrated into the child's total educational programme for 20 children. An initial reading programme suited to the child utilizing symbols was drafted and introduced to the advanced class. The linguistic study moved from its focus upon vocabulary development to data collection. Responsibility for one specialized area within the symbol programme, that of interface development, was assumed by the disciplines most involved - Rehabilitation Engineering and Occupational Therapy. The area of investigation was extended to include the development and application of interfaces to many types of equipment, (e.g. electric typewriters, electric wheelchairs, toys).

The organizational structure of the Symbol Communication Programme underwent change. The increased work load resulting from the continual growth of the programme made it necessary for the role of director to be assumed by a person working full-time in the programme. Maurice Izzard, School Principal resigned as director in July 1974 and Shirley McNaughton, formerly supervisor of the project, assumed this responsibility. The encouragement, support and vision of Maurice Izzard will be long remembered. He provided a setting in which a new idea could grow and gave generously of his time and knowledge to the symbol programme's early development.

The inter-disciplinary team structure, necessary during the early developmental years, was discontinued and former team members assumed resource roles with regard to the classroom programme. This enabled the experienced staff members to concentrate their main attention either to research responsibilities, or to their areas of specialization.

Symbol vocabularies in the 100, 200, and 400 design were finalized and remained the same except for the "stamp" revisions which were added during the fall term of the

1974-75 school year. The revision stamps were designed following consultation with Charles K. Bliss and are available to all known symbol instructors utilizing the O.C.C.C. symbol displays.

Mr. Bliss visited O.C.C.C. in May 1974, and met for two days with all members of the O.C.C.C. Symbol Communication Team. Symbol construction and possible revisions were discussed. The role of Mr. Bliss as Consultant re symbol construction was later formalized within the Formative Evaluation Study, funded by the Ontario Ministry of Education.

Data collection was undertaken by the Psycho-Educational Consultant and Speech Pathologist for the purpose of (i) recording change of performance of children and (ii) developing testing tools to be utilized in the Evaluation Study.

Two surveys were conducted to gather needed background information. (1) A survey of physically-handicapped children in Ontario who lack functional speech, utilizing the active case load records of Ontario Society for Crippled Children's District Nurses (Appendix A). (2) A Preliminary Survey of known symbol users, June 1974 (Appendix E).

The symbol programme's resource service to other centres was continued and extended. Four instructional workshops were given, a Teaching Guideline, and a dictionary of those symbols appearing on O.C.C.C. displays were completed. University lectures and a presentation at the meeting of American Association of Mental Deficiency in June 1974, Toronto, were given; a Symbol Research Co-ordination Conference, attended by representatives from five American and Canadian Centres was hosted at O.C.C.C. Symbol instruction was given at a Regional Training Course, Stanford Children's Hospital, sponsored by the American Academy of Cerebral Palsy. All members of the Symbol Programme Resource Staff participated in a one-day discussion with Greg Vanderheiden, contributing to the State of the Arts Paper being written by the Cerebral Palsy Communication Group, University of Wisconsin, Madison, Wisconsin.

In September a Formative Evaluation Study, funded by the Ontario Ministry of Education was initiated. Dr. Harry Silverman, Chairman of the Department of Special Education, Ontario Institute for Studies in Education, is contributing to the study as Co-director representing the Ministry of Education. Charles K. Bliss is serving as

consultant with regard to symbol composition.

Through this project, records are being kept from December 1974 to December 1975 regarding the Communicative, Academic, Psychological and Social progress of 160 symbol using children. (See Abstract, Appendix C). The study's focus of attention is being directed toward a description of the known symbol-using population, factors which influence the effectiveness of symbol learning (those relating to the child, his learning environment, his family) and instructors assessment of the manner in which symbol learning affects the child's educational programme. Supplementary information regarding instructional procedures, teaching aids and the effect of symbols in the home is being obtained through interviews with instructors in 19 sub-population settings and through a questionnaire distributed to parents. Upon completion of the study in August 1976, a Handbook for Instructors, Parents and Administrators will be printed and standard vocabularies will be produced. Included with their participation in the Evaluation Study, is the agreement on the part of all instructors to consult with the Evaluation Study Co-directors prior to adding any newly devised symbols to children's permanent displays. It is hoped in this way to standardize new symbols required in the core vocabularies of physically-handicapped children. Consultant advice re such symbols has been made available to any interested instructor through the Symbol Communication Programme O.C.C.C. which is assisted by the services of Charles K. Bliss.

Two events must be singled out as being particularly rewarding during 1974. On November 12th the film Mr. Symbol Man (co-produced by the National Film Board of Canada and Film Australia) was shown for the first time at O.C.C.C. Present were the symbol children, their families, O.C.C.C. Administrators and Board Members and the staff involved in the Symbol Communication Programme. The excitement of the children permeated the auditorium and made the occasion an unforgettable event. High regard for the director of the film (in Canada) Bruce Moir, and its producer Tom Daley was felt by all present. A second highlight of 1974 was the gathering together in November of over 40 instructors who had agreed to participate in the 2-year Evaluation Study. Their enthusiastic and willing commitment to the documentation of their symbol programmes made the two day instructional workshop re recording procedures a warm and rewarding experience for the O.C.C.C. research staff.

The transition to an evaluation emphasis and the continuous growth in information interchange with other symbol-using centres made 1974 a stimulating and rewarding year. The appreciation and gratitude of all those involved in the daily operation of the symbol programme goes first to Charles K. Bliss for the many years he devoted to developing Blissymbolics and secondly to the Ontario Crippled Children's Centre School Board, the Crippled Children's Centre Board of Trustees, the Ontario Society for Crippled Children and the Ontario Ministry of Education. Their continuous support is allowing Symbol Communication to affect the lives of countless children throughout the world.



PHOTOGRAPH #1
KINDERGARTEN CHILD USING
100 SYMBOL DISPLAY



PHOTOGRAPH #2
TWO ADVANCED CLASS CHILDREN
USING 400 SYMBOL DISPLAYS

CLASSROOM PROGRAMME

The Classroom Programme has included the following areas of activity during the school year:

1. Integration of symbol usage into the total educational programme.
2. Continued development and exploration of methods of instruction.
3. Clarification of the unique needs of the children with respect to symbol usage.
4. Initial work on development of a reading programme suited to the child utilizing symbols in learning to read.

The classroom programme involved the supportive services of all resource staff. The Occupational Therapist worked with the teacher in the classroom and was responsible for seating, equipment, method of access to symbols (see page 21). The Rehabilitation Engineer was responsible for providing and servicing displays and interfaces, and contributing ideas for improved methods of access to symbols for severely involved children. (See page 18). The Speech Pathologist treated those children assessed as requiring therapy and served as a consultant in weekly meetings with the teachers. The Psycho-Educational Consultant worked with teachers in a consultant role and with the children in a counselling and co-ordinating role, as needed. The Linguist gathered data re children's output and responded to the need expressed by the teachers with regard to symbol vocabulary. The Supervisor served as resource to the teachers re symbol instruction and supervised the development and application of a reading programme designed for the symbol-using child. It was also the responsibility of the Supervisor to correlate the activities of all team members as they related to the classroom programme and to ensure that the educational programme was adequately supported without being unduly interrupted. The children were grouped into three classes, Kindergarten, Intermediate and Advanced. In all classes, symbol instruction was integrated into the total educational programme which included listening to stories; listening to tapes or records of poetry, prose and music; learning activities appropriate to the level of the child; social experiences; excursions; workshop and kitchen experiences; music, art, swimming; mathematics, geography, science and word experiences at the level of the children.

A brief summary of each class follows:

A) Kindergarten Class - 5 full time children; 3 part time children

Age Range - 5 years to 12 years - first year for intensive symbol instruction for all children.

Number of symbols learned between September and June - 48, 50,60,80,80,80,100,100+

Wide Range of symbol use as indicated by teacher's comments :

- Child 1) very limited use, usually on direct request - (gross pointing)
- " 2) positive attitude and consistent use - short phrases used at home constantly
- " 3) refuses to use symbols out of symbol class -needs real reason for using them
- " 4) spontaneous, integral part of her -short phrases and sentences -excellent retention of new symbols -doesn't use questions or many verbs
- " 5) symbols are second to verbalizing and gestures -attentive to what other children say with symbols
- " 6) supplement to speech -long symbol phrases and short sentences -reads printed symbol sentences -uses all categories of symbols on 100 vocabulary
- " 7) some exploratory, manipulative use of symbols -some accurate spontaneous use -short phrases -general awareness greatly improved in all areas
- " 8) increasing amount of spontaneity -more assertive nature -general awareness and concentration improving -strong parental encouragement (e.g. of output see Appendix B)

B) Intermediate Class - 6 full time children

Age Range - 8 years to 13 years

2 children with 2 years of prior symbol instruction

2 children with 1 year of prior symbol instruction

2 children new to intensive symbol instruction (but had symbol displays available to them and some instruction previous year).

Began year using approximately:

- 60,120,140,140,140,140, symbols
- 3 children finger-pointing
- 3 using electronic displays
- February - all 6 children were using full 200 vocabulary; transferred to revised 200 vocabulary
- May
 - 5 children transferred to 400 vocabulary
 - 4 children using 300 symbols; 2 remained at 200 usage level.

Teacher's comments:

Growth was observed:

- in ability to communicate
- in ability to attend to news of others
- in ability to assist others in clarifying a message
- in ability to question perceptively

Since the intermediate class contained the greatest number of severely involved children the following objectives were established:

- to produce the best telegraphic output and de-emphasize speed
- to concentrate upon enabling the "listener" to comprehend
- to supplement symbol output with body language in the form of gesture and eye communication.

Examples of progress in symbol output and examples of symbols composed from 200 vocabulary appear in Appendix B.

C)Advanced Class - 6 full time children

Age Range - 8 years to 16 years of age

- 2 children with 2 years of prior symbol instruction, using 400 symbols
- 2 children with 1 year of prior symbol instruction using 400 symbols
- 1 child having had irregular instruction in another setting with a 340 display
- 1 child with a new 200 electronic display

December - all children gradually introduced to revised 400 display

June

- 5 students making effective use of 400 display
- 1 student using 200 electronic display plus supplementary vocabulary for gross pointing.
(For examples of output see Appendix B)

Teacher's comments:

- symbols in advanced class were utilized fully as a substitute for speech
- activities for clarifying concepts, encouraging divergent/convergent processing, problem-solving were possible.
- symbol-word dictionaries were introduced
- children learned to state information clearly and concisely, to ask relevant questions, to be part of group "brain-storming" sessions and to co-operate with others in arriving at solutions.
- interaction with peers developed concurrently with increased facility with symbols.
- vocalization increased

READING PROGRAMME

Under the direction of the programme Supervisor, a reading programme based upon the model of reading of Dr. F. Smith, Ontario Institute of Studies in Education was developed. (i) The programme was introduced to seven children in the winter term. The number of individual lessons ranged from 5 to 10. The programme was based on a sight vocabulary (chosen from the 400 vocabulary) and on symbol sentences into which the sight words were gradually introduced. Size of sight vocabularies of individual children ranged from 37 to 69 words; all children progressed to reading complete word sentences.

At the end of the school year, in June 1974, the children were assessed on a 204 word sight vocabulary selected from words appearing on the 400 vocabulary, which also appear in early primers. The percentage of words known for children using the 400 vocabulary ranged from 45% to 77% with 3 of the 6 children knowing over 70% of the words tested. The vocabulary consisted of words for which no formal instruction had been given.

(i) Smith, Frank - Understanding Reading, Holt, Rinehart & Winston, 1971

COMMENTS BY PSYCHO-EDUCATIONAL CONSULTANT

During the year much time was spent in the informal collection of data. The purpose of this was to record the change in performance of children in the areas of:

- a) symbol communication
- b) social interaction
- c) categories and modes of communication
- d) language development
- e) cognitive development

Assessment has been considered from two points of view: development of the initial assessment inventory as well as continued and on-going assessments of the children as they acquire greater expressive communication skills.

The initial assessment inventory is being developed jointly with the Speech Pathologist. This assessment procedure is currently still under development and continued evaluation. The purpose of the assessment is to determine the suitability of symbol communication for a child, as well as, to make recommendations as to the programme for instruction. The approach used to accomplish these purposes is based on a consideration of specific variables.

Once children were using 400 symbol display, it became possible to assess their intellectual functioning using more sophisticated instruments - approximating those used to assess the speaking population.

The verbal section of the Wechsler Intelligence Scale for Children (WISC) was administered to six children in the advanced class. A common pattern of strengths and weaknesses emerged from these assessment results. Generally the children were found to be functioning within average limits in verbal reasoning ability, in expressive vocabulary skills and in ability to attend to visual details. With some individual variations, the children showed relative weakness in information from environment, arithmetic, social judgment, ability to attend to auditory detail.

While all the children were still functioning at Piaget's preoperational stage of development, there was

significant development in their ability to classify objects. Their explanations for the categorizations which they selected incorporated a more abstract level of reasoning. (These observations were possible through being able to administer Vernon's (1965) Battery of Piagetian-based tasks.)

In using an adaptation of Burton White's Social Interaction Scale and an informal rating scale of categories and modes of communication, a significant change was recorded in adult and child interaction and in categories of communication. Seventy-five percent of the children showed significant positive change re adult-child-interaction; fifty percent of the children showed significant positive change re peer-interaction; 75% of children increased in their amount of purposeful vocalization; 62% increased in frequency of expressing emotions.

COMMENTS BY SPEECH PATHOLOGISTS

During the 1974 Spring Term, eight of the eighteen children were assessed as warranting an active speech remediation programme. Speech therapy had been discontinued for these children prior to introduction of symbols. Some general observation which can be made as a result of testing are as follows:

- A majority of the eighteen children showed significant improvement in scores on the receptive portion of Northwestern Syntax screening between December 1973 and June 1974.
- Significant progress was shown in the area of receptive language for the nine children for whom the Reynell Developmental Language Scale was appropriate.
- The results in administering the expressive portion of the Northwestern Syntax test cannot be scored but they show:
 - 1) all six children in the advanced class can express themselves in sentence form.
 - 2) each child varies in the way he expresses the same sentence (See Appendix B-8).

The lack of standardized tests to assess adequately the language development on non-verbal physically-handicapped children is a severe obstacle to objective recording.

Esther Barker - Nov.'73 - June '74

September - December 1974

After a reassessment of all the children in the communication classes, therapy was resumed for articulation and language remediation skills for four children. The remaining three received active treatment to promote better overall control of the oral musculature to increase breath support and facilitate more accurate tongue movements.

One child remained under observation during the 4 month period from September to December because he became dysfluent and began to repeat initial consonants. The child was speaking more and more frequently and using his

symbols less and less. It was felt that he may be experiencing some "pressure" when speaking because he was losing his former facility with symbols and relying more and more on his oral speech. It was decided to discontinue therapy if there was not a distinct improvement in his fluency by January 1975.

The Northwestern Syntax Screening Test, the expressive subtest, was re-administered in October to six of the more advanced symbol users. The findings were similar to those recorded earlier from the March 1974 testing. Generally there was a trend towards fuller grammatical sentences. The majority of the children were putting in a tense indicator when there was separate emphasis on the auxiliary verb.

e.g. He is coming - child would indicate present tense.
He comes - child would not indicate present tense.

The majority of the 18 children also showed significant improvement in their receptive comprehension levels and scores on the receptive subtest of the Northwestern Syntax Screening Test. Problems are anticipated for further assessment of the children's receptive language, as most of them have reached the uppermost limits of the tests available. This area of testing materials is still under investigation.

Dale Sutherland,
Speech Pathologist

LINGUIST'S SUMMARY

The Linguist's responsibilities in the Symbol Communication Research Project have been two-fold:

- (1) during the first two years, development of a system of communication appropriate for non-speaking children.
 - (2) during the final year of the three-year research grant, recording and analysis of the children's symbol output.
1. During the year 1973-74, revisions of the 100, 200 and 400 vocabularies were completed by the linguist (see Appendices F-1, F-2, F-3). The new feature common to all these displays is the vertical arrangement of the symbols by parts of speech, so that there is a left-to-right progression across the display following the order of a typical English sentence. This design, which separates the grammatical categories much more distinctly than did the earlier displays, is intended to reinforce the children's feeling for sentence-patterns. Chart 1 illustrates the organization of the 400 display.

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z		
															0	1	2	3	4	5	6	7	8	9			
															Time												
															Weather												
															Nature												
															Buildings, places												
															Furniture, etc.												
															Transport; recreation												
															Clothing; substances												
															Communication												
															Utensils, etc.												
															Body functions; food												
															Body Parts												
ADJECTIVES																											
DETERMINERS;														QUALIFIERS													
PREPOSITIONS																											
														VERBS													
TENSES 'NOT'																											
PRONOUNS;														HUMAN NOUNS													
CONJUNCTIONS																											
SOCIAL PHRASES;														QUESTION WORDS													

CHART 1
ORGANIZATION OF THE 400 SYMBOL DISPLAY

The original colour-coding from the 1972 340-symbol display has been retained. The 1973-74 100, 200 and 400 displays were introduced into the O.C.C.C. classrooms during the winter term and were printed and available for distribution to other centres by April 1974.

Over the Summer 1974, the linguist co-ordinated the development of the 512 display, with the participation of the other team members. It is designed to meet the specifications for a new electronic display incorporating a "memory" (see Rehabilitation Engineering report).

A dictionary of all the symbols appearing on the O.C.C.C. displays was compiled for the Symbol Communication Research Project Teaching Guidelines published in September 1974. Also in the Guidelines are two sets of rules of syntax, those developed by the linguist in 1973 and those recommended by Mr. Bliss.

Throughout the 1973-74 school year, short weekly meetings were held with individual teachers and the other team members responsible for symbol selection and vocabulary development (i.e. the Director of the project, and members from the Psychology and Speech Pathology Departments). The selection of new symbols was decided by consensus, using feedback from the teachers as to the needs of the children. Following Team consultation with Mr. Bliss in May, 1974, stamps for new and revised symbols were printed and made available to all users of O.C.C.C. vocabularies.

With the completion of the 512 display, the linguist's involvement in the further development of the symbol system terminated.

2. From September 1974, the linguist has been able to concentrate on his second area of responsibility. While recordings of the children's output were made during the 1973-74 school year, a satisfactory recording programme was not implemented until September 1974. Now, a weekly half hour session is held with each of the 12 children in the primary classroom, using both videotape and on-the-spot hand-recording techniques. A volunteer is assisting the linguist in this work, giving two half days per week - she has also contributed a valuable

method of communication with the most handicapped children: simply using a sheet of paper to cover part of the display and asking "can you see the symbol now?" and thus narrowing down to the desired symbol. This method permits relatively fast access to the entire display with a minimum of effort, requiring just a "yes" or "no" response, and under certain circumstances it has proved most effective.

Over the period from September '73 to December '74 the children have all been improving and refining their communicative skills. While telegraphic style is still the rule, more complete sentence structure is definitely evolving. The use of grammatical elements such as tense and plural is sporadic, but the ability to make such distinctions when necessary is developing. It is particularly encouraging to see the emergence of subordinate clauses, along with the use of such words as "maybe", "but", "if", "because", etc.

It appears that the children's development of expressive language does in many ways parallel the normal child's acquisition of his first language - to what extent this is so is a major question in the linguist's investigation and will be discussed in his final report (1976).

The linguist's position in the Symbol Communication Research Project is supported by a grant made by the Ontario Society for Crippled Children.

REHABILITATION ENGINEERING REPORT

Rehabilitation Engineering has been involved in the following areas:

S.C.R.P. "512" Display for Non-Pointers

A prototype "512" display for non-pointers was designed with two objectives in mind. The first of these was to extend considerably the vocabularies within the device at his own pace. This is important since it is apparent that some of our children are able to function at a much higher level if there isn't a second person waiting for their answer, much like someone who stutters when speaking to someone else but doesn't stutter when speaking to himself or someone with whom he is very familiar.

The device is controlled by four functions. The first function alternately cycles the indicating lights to the left and right and similarly the second function up and down. The third function when activated remembers the symbol which is being presently indicated. The fourth function causes the remembered symbols to be cycled in the order in which they were chosen, this is repeated until the function is activated again which stops the cycling. If the third function is activated when cycling is in progress the machine "clears" itself.

This device is scheduled for introduction in the classroom in September 1975.

A "400" Symbol Display for Pointing Children (Interpersonal Display

This unit was originally conceived to provide the pointing children with the ability to communicate among themselves. Work was started on the prototype in early 1973. The prototype was delivered in the following fall and a second unit was finished in the middle of March. Some use was made of the system even though the symbol vocabulary was out-dated at that time. Presently the vocabulary is being changed to the new "400" to be ready for classroom use in September (see photograph #3).

S.C.R.P. "100 x 100" MK II Display

The old "100 x 100" MK I electronic symbol display for non-pointing children has been redesigned so that it can be more easily manufactured and hence more readily available to children outside the Centre. Its mode of operation is exactly the same as the older unit. The scanning system can be operated by two functions in a reversing or non-reversing mode, or by four functions (see the 1972/73 report for a more complete description).

Seven definite orders have been received for these devices from various centres in Canada and the United States. A summer student was hired under the Rehabilitation Engineering Services budget to build this limited number of devices.

Supportive Rehabilitation Engineering Services

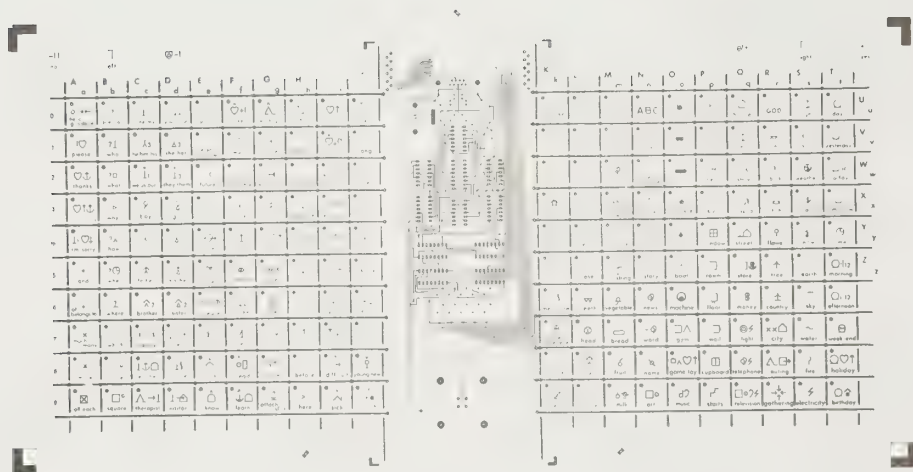
New seating, trays and pointing displays have been provided as the need has arisen due to child growth, ear, etc., (see Occupational Therapist's Report).

General Maintenance Etc.

The electronic displays require periodic maintenance and modifications to meet changing needs. For example the symbol vocabulary was changed to the new 200 set early in the beginning of the new year. The interfaces themselves are subject to considerable stress hence require maintenance.



PHOTOGRAPH #3 - 400 INTERPERSONAL DISPLAY



PHOTOGRAPH #4 - "100 x 100" MK II DISPLAY

OCCUPATIONAL THERAPY REPORT

Two part-time Occupational Therapists contributed to the S.C.R.P. programme during the 1974 school year. Their involvement with regard to symbol use covered special seating arrangements to facilitate accessing of symbols, development of interfaces, introduction of coded displays for the fist pointing, upgrading of hand skills, exploring use of other body parts for activating symbol display, training on new interfaces and designing of play equipment to facilitate symbol learning and hand function.

INTERFACES DEVELOPED IN 73/74

(i) JOY STICK #1

Consists of a rubber bushing, plastic vacuum formed housing, metal plate and stick, plastic knob and four micro switches. The metal plate can be cut to give any particular form of gating required. The rubber bushing provides a certain amount of damping for the child's erratic movements. (see Figure #1)

ADVANTAGES

- a) easily fabricated hence relatively inexpensive
- b) very durable
- c) provides mechanical damping and gating
- d) upon release returns to a central position
- e) size and shape of knob is variable
- f) fits neatly beneath a child's tray, without interfering with his legs.

DISADVANTAGES

- a) the flexibility of the rubber bushing cannot be changed; this results in a fairly stiff joy stick.
- b) has to be fixed to the child's wheelchair or tray hence its use is limited. (see photograph #5)

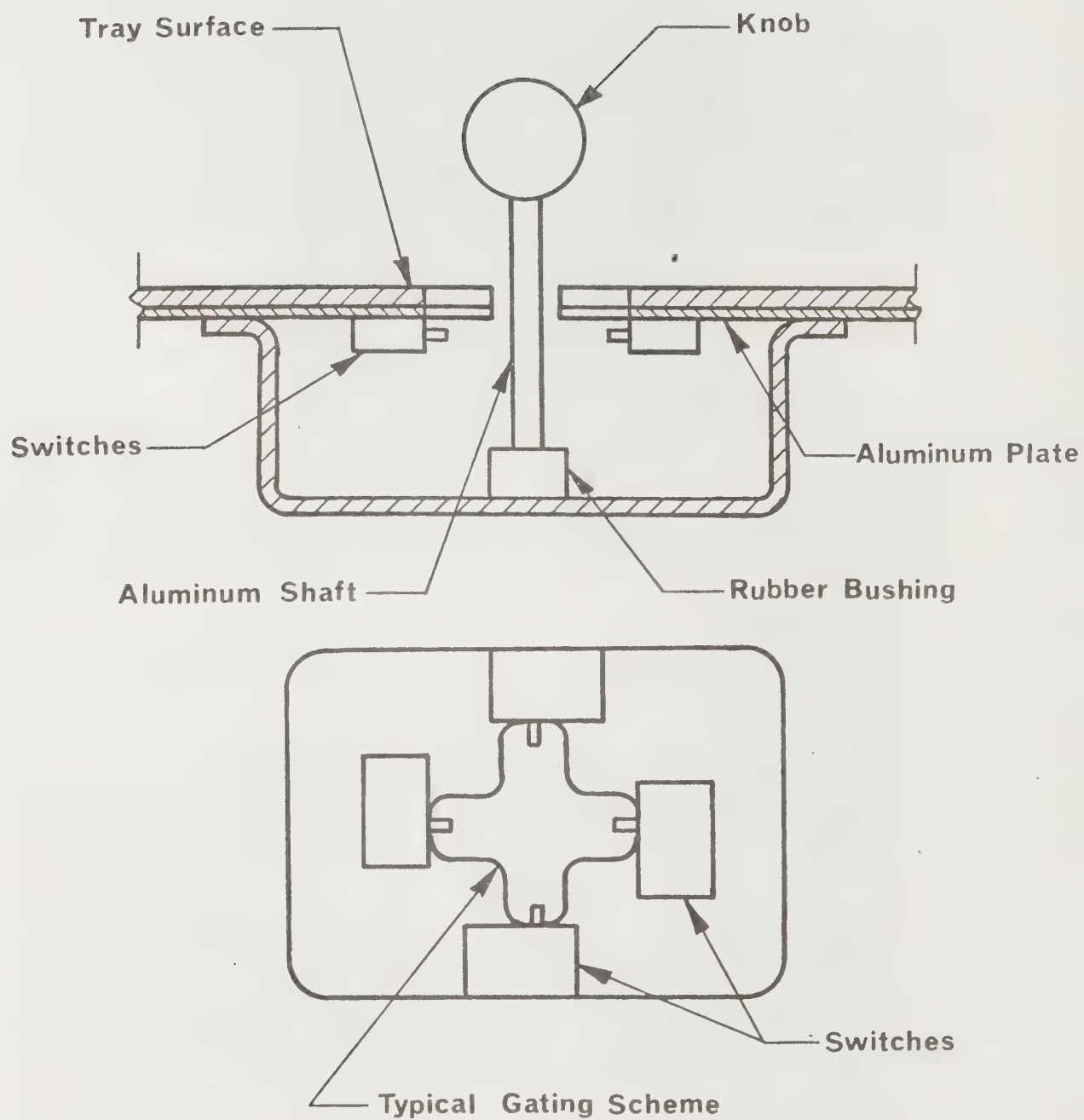


Fig. 1 (a) Construction details of standard Joy Stick
 (b) Typical Gating Pattern



PHOTOGRAPH #5 - PICTURE OF TRAY MOUNTED JOY STICK

(ii) JOY STICK #2

Fabricated in the same manner as Joy Stick #1. It is unique only in that its gating scheme permits this interface to control both on electric sheelchair as well as on electronic symbol display.

The diamond shape of the gating combined with the square crossection of the joy stick enable the severely involved child to activate either two switches at once or one switch at a time by relatively gross movements. (see Fig.#2-a) This is necessary to control any of the more commonly available electric wheelchairs.

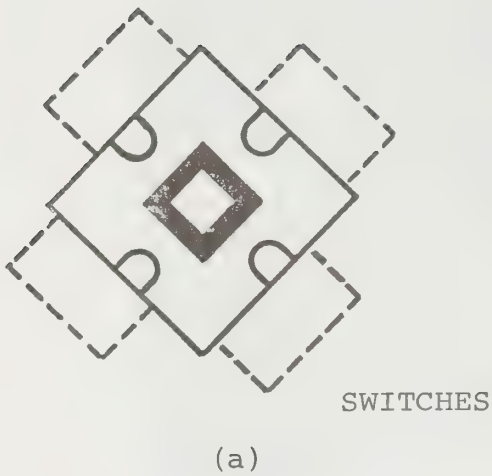
ADVANTAGES

- a) Eliminates the fine co-ordination required to utilize the non-gated joystick.
- b) Can be used to control a display in at least four different functions.
- c) The gating can be modified to reduce the required co-ordination even further (see Fig. #2-b).
- d) See joystick #1

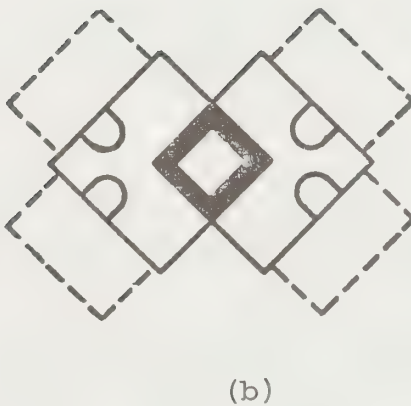
DISADVANTAGES

- a) Not easily mountable on a wheelchair alone (i.e.without tray)
- b) See Joystick #1

DIAMOND GATING



PHOTOGRAPH #6



SQUARE SHAFT

Fig. 2 (a) This joy stick is identical to the previous one except for the gating scheme and square shaft

(b) Additional modification to further reduce required co-ordination

Photograph #6 - Unit in use

(iii) OVERHEAD JOYSTICK

Is the same basic construction as (i) except that it is held upside down over the child (see Figure #3). This particular unit has been designed to incorporate the head of a photographer's tripod making it very adjustable. It is a prototype unit and was designed to fit as many children as possible. By placing the joystick in this fashion one can accommodate a wide variety of large gross unco-ordinated movements. The bottom of the joystick is also fitted with a holder for crayons, marking pens etc. enabling the child to draw to a limited extent.

ADVANTAGES

- a) It is suitable for the very handicapped unco-ordinated child.
- b) The length of the suspended rod provides a mechanical advantage for gross shoulder movements. The free swinging rod also provides a larger number of possible contacts along its length than the normal joystick (see interface - i).
- c) Like any joystick it can perform a minimum of four functions.
- d) Can also be used for other activities (e.g. drawing, painting) to compensate for the lack of fine handskills.

DISADVANTAGES

- a) Is relatively complex hence expensive.
- b) Is cumbersome in appearance; requires frequent manipulation, as the child is taken in and out of the chair.

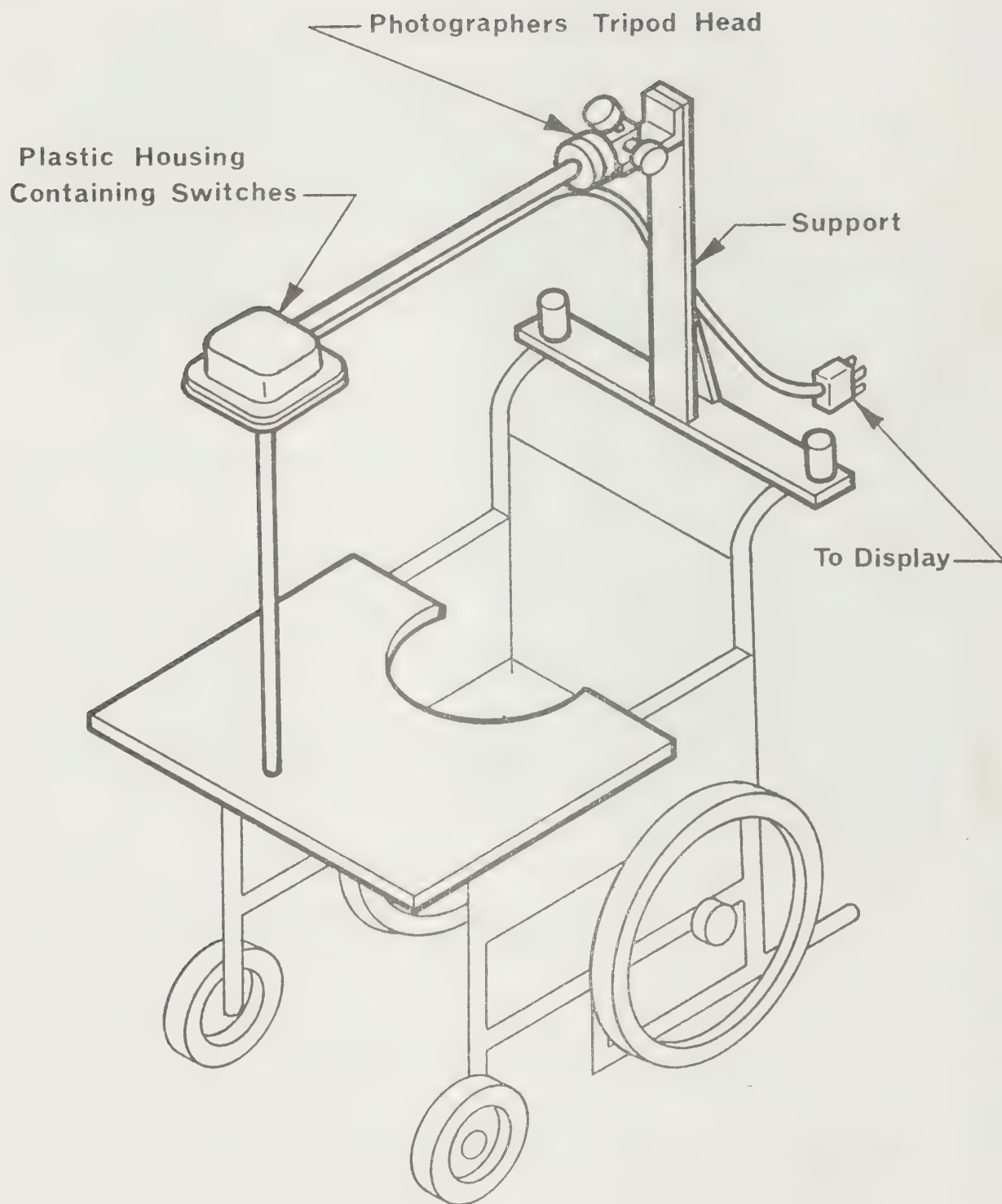
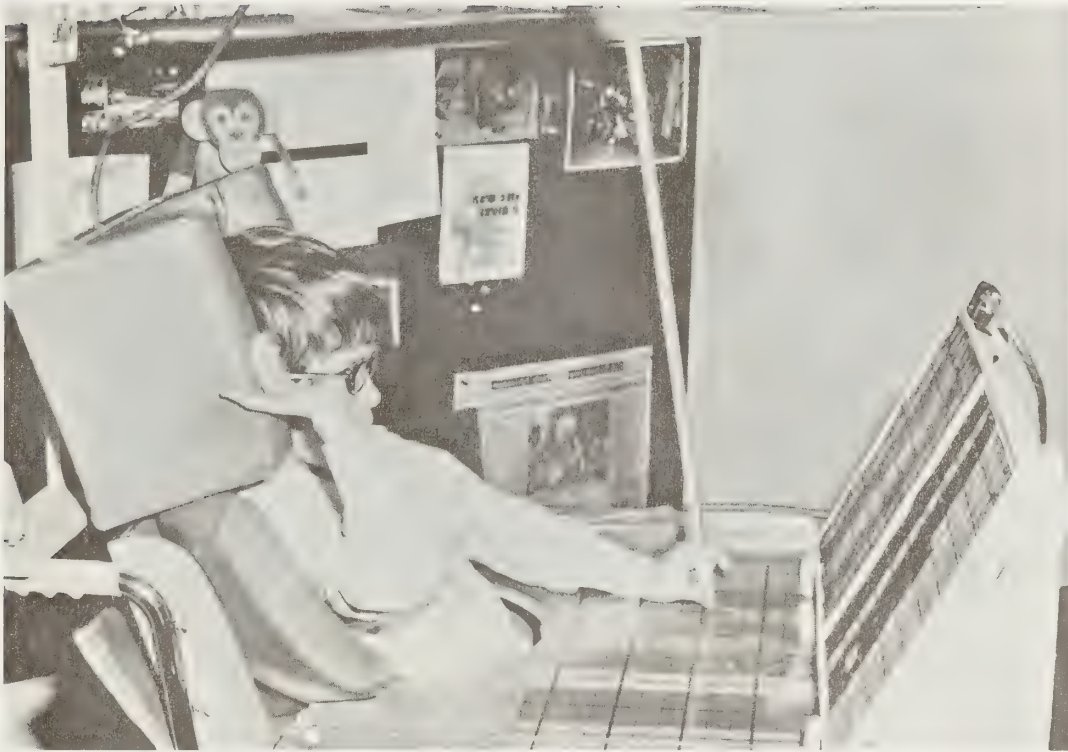


Fig. 3 Shows mounting of "Overhead Joy Stick on
Wheelchair



PHOTOGRAPH # 7 - PICTURE OF "OVERHEAD JOY STICK"

(iv) SLIDING SWITCH

Consists of a hollow cylinder sliding on a rod. When the cylinder is pushed all the way to one side or the other a switch is activated which controls one of the electronic symbol display boards. (See Fig. #4)

ADVANTAGES

- a) Requires a minimum of co-ordination
- b) Is simply fabricated hence relatively cheap

DISADVANTAGES

- a) Although it is relatively easy to turn one of the switches on, it requires an active movement on the part of the child to turn it off, (i.e. there isn't any spring return). For the Cerebral Palsied it is more difficult to initiate an action than it is to terminate it.
- b) The interface takes up a considerable amount of room on the child's tray, much more than a joystick for example.



PHOTOGRAPH #8 - SLIDING SWITCH IN USE

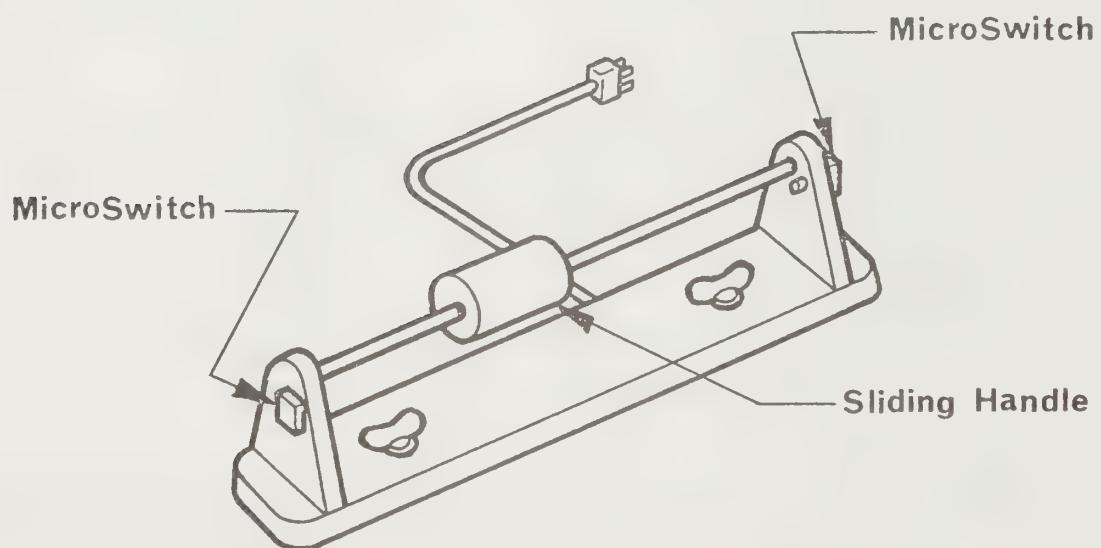


Fig. #4 - Sliding Switch

(v) FLAT SURFACE SWITCH

Consists of a plastic flap which when depressed activates a micro-switch. This approach is particularly suited for modifying the trays constructed at this centre since they already have a plastic covering of one eighth inch polycarbonate. This means that a flap can be cut from the tray itself. If this is done properly one is left with a flat flush surface which has one or more sensitive areas (see Fig. #5).

ADVANTAGES

- a) Because it is flush with the tray's surface it doesn't get in the way of other activities.
- b) The sensitivity can be adjusted so that only a very light touch is required.
- c) The device can be operated by the hand, foot, or head stick (see Photograph #9).
- d) The surface can be a large variety of shapes and textures .

DISADVANTAGES

- a) Liquid and food tend to get under the flap especially when it is incorporated into the tray.
- b) Incorporation into a tray is a difficult time consuming task and hence expensive.
- c) Like other tray or wheelchair mounted switches it can be used only when the child is in his wheelchair.



PHOTOGRAPH #9 - FLAT SURFACE SWITCH IN USE

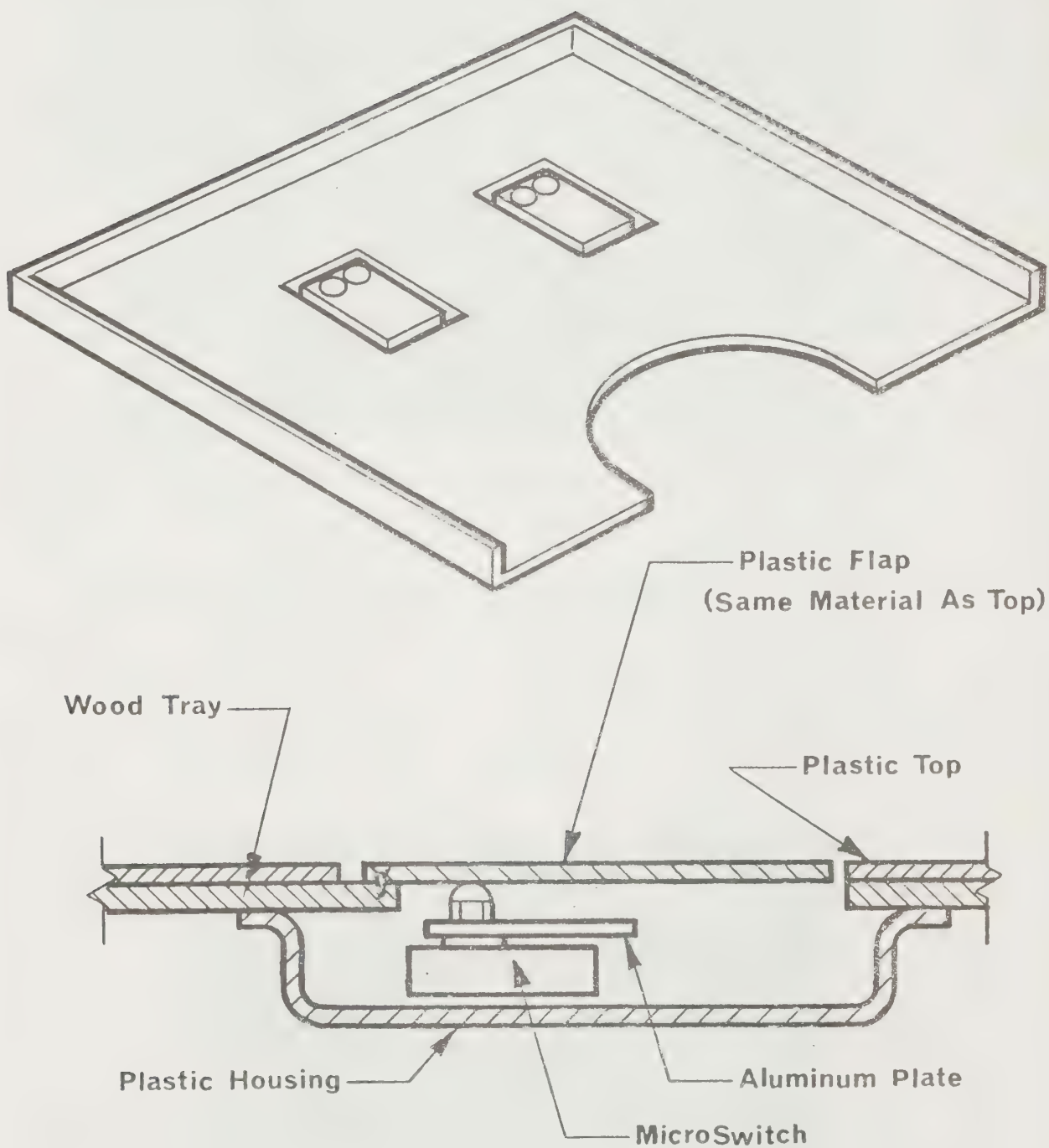


FIG. #5 a) Diagram of two flush mounted surface switches in plastic covered wooden tray
 b) Shows construction details

(vi) HAND PADDLE

This is a modified version of last year's horizontal toggle switch. The complete switch is manufactured from a tough flexible plastic that is virtually non-destructible (see Fig. #6) and uses microswitches in place of the toggle switch.

ADVANTAGES

- a) More easily constructed and hence cheaper.
- b) Uses cheaper components.
- c) Is difficult to break hence requires virtually no maintenance.
- d) It can be operated without the child lifting his hand from the tray surface.

DISADVANTAGES

- a) It occupies excessive space on the child's tray.
- b) It is limited to only two functions.



PHOTOGRAPH #10- HAND PADDLE IN USE

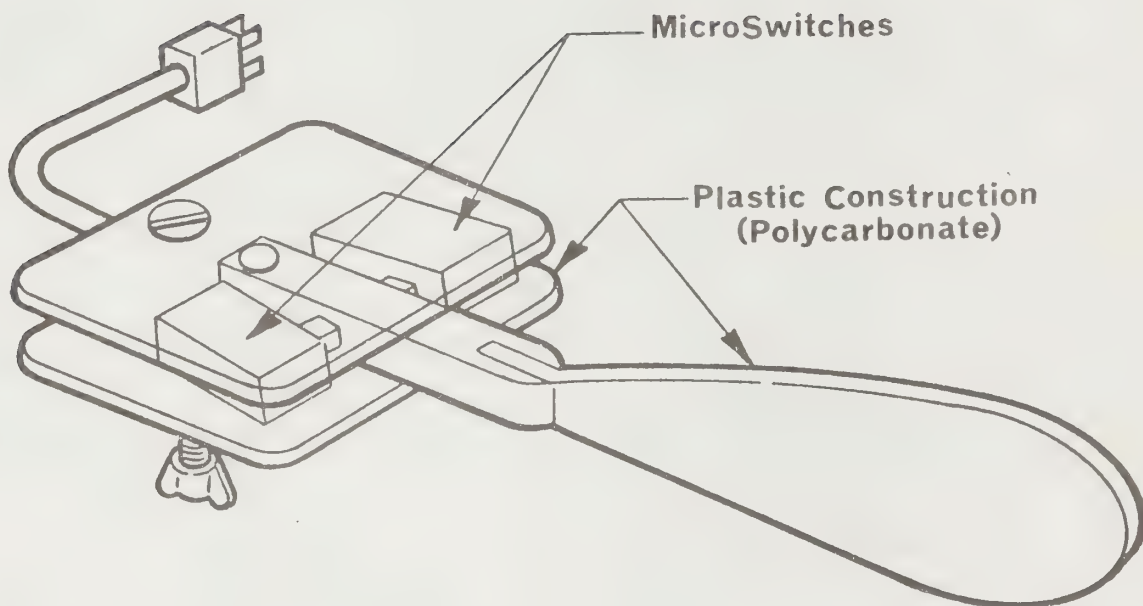


Fig. #6 - Showing Construction of
Hand Paddle

(vii) HEAD CONTROLLED LIGHT BEAM POINTER

The optics from a commercially available light beam pointer have been attached to the harness of a head stick (i.e. in place of the stick). This appears to be a suitable interface for a child with reasonable head control but severely involved in the rest of his body. Because the device shows promise for some children it is to be redesigned to make it more compact and also more cosmetically pleasing.

ADVANTAGES

- a) It provides a means of direct pointing without coding such as in (viii).
- b) It eliminates many of the problems of the head stick especially spasticity of the jaw muscles and drooling which the headstick seems to provoke.

DISADVANTAGES

- a) Is not very cosmetically pleasing especially in its present form.
- b) Does require reasonable good head control.
- c) Requires a fairly large display (depends on child's head control) directly in front of the child blocking his view.
- d) Light not bright enough in sunshine.



PHOTOGRAPH #11-"HEAD CONTROLLED LIGHT BEAM POINTER"

COMMERCIAL LIGHT BEAM POINTER

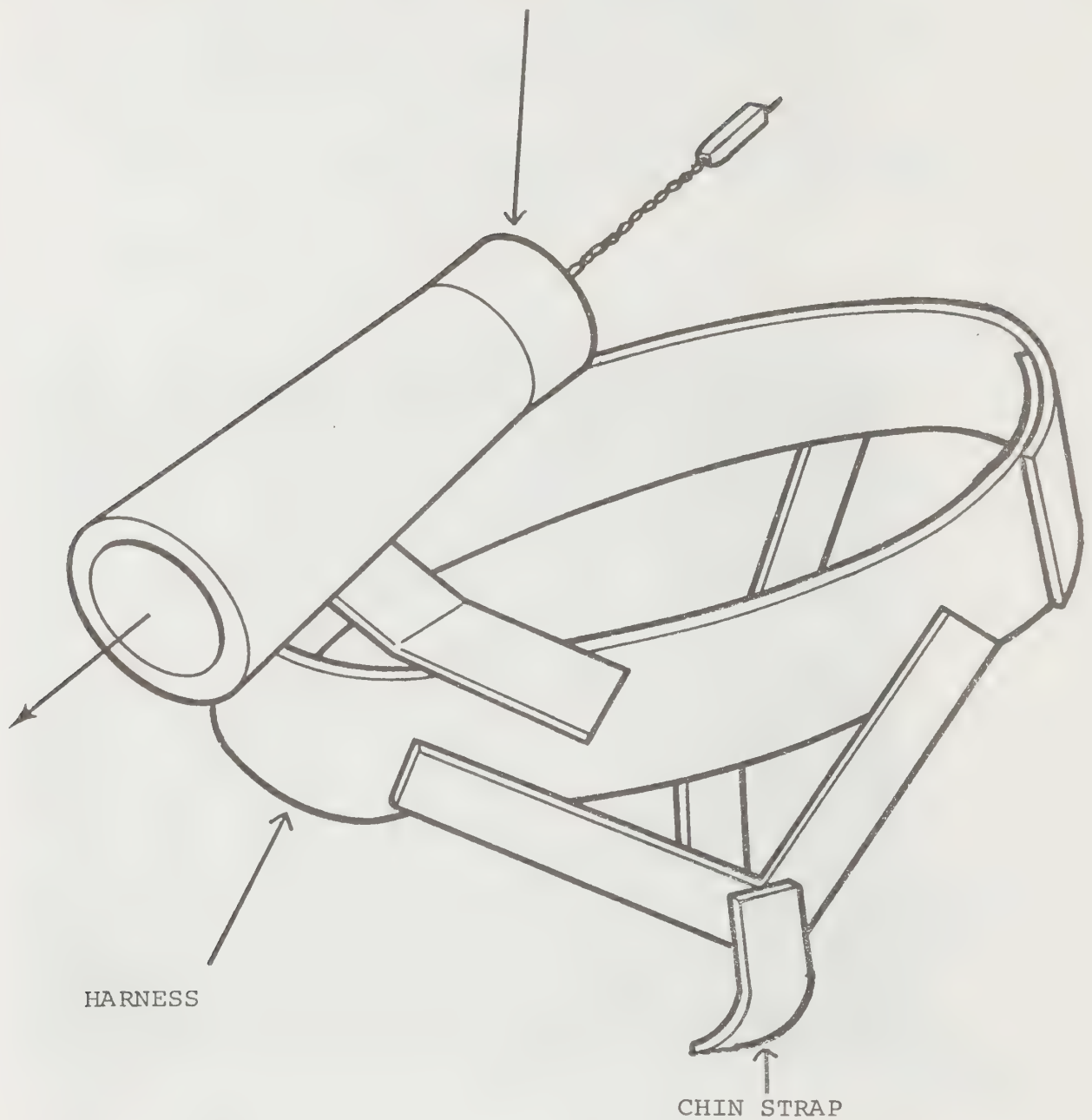


FIG. #7 - "Head Controlled Light Beam Pointer"
Construction

(viii) EYE-DIRECTED SYMBOL DISPLAY

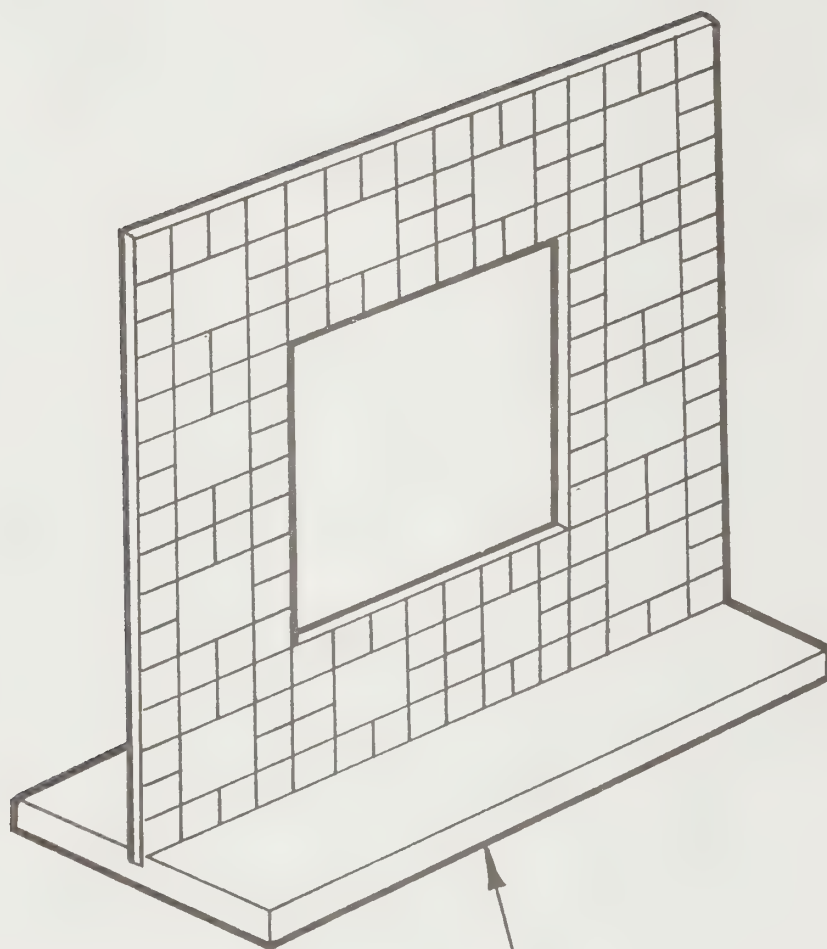
Consists of a large clear plastic frame. Symbols are placed around the margin of the frame (see Fig. #8). A person communicates with the child by looking at the child's eye and head movements through the clear central area of the frame. The child looks at a specific quadrant which contains the symbol wanted. The symbols within a given quadrant are arranged in the same manner as the quadrants are arranged about the periphery of the frame. Hence the child can indicate exactly which symbol he wants within a specific quadrant by a second look at another quadrant which corresponds geometrically to the location of the desired symbol.

ADVANTAGES

- a) Method seems to work with some of our most severely involved children.
- b) When using the device the children remain relaxed in a proper upright position.
- c) Forces person to have face to face contact with the child as in normal conversation.

DISADVANTAGES

- a) Is a very large bulky device.
- b) Coding is quite complex to the uninitiated.
- c) Is difficult in a classroom setting since it requires the complete attention of the Teacher.
- d) One party must look at the symbols reversed.
- e) It requires intense visual concentration and is therefore difficult for those children lacking precise visual acuity.



Clear Polycarbonate Frame

Fig. #8 - EYE-DIRECTED SYMBOL DISPLAY



PHOTOGRAPH #12 - EYE-DIRECTED SYMBOL DISPLAY IN USE

RESULTS OF ONTARIO SURVEY REGARDING PHYSICALLY HANDICAPPED CHILDREN WHO LACK FUNCTIONAL SPEECH - Compiled by Ontario Crippled Children's Centre - Symbol Communication Research Project from Information provided by O.S.C.C. District Nurses

From O.S.C.C. District Nurses Active Case File, May 1974

1. Number of Non-speaking Children.....359
2. Percentage of non-speaking children within population

	Total Number of Children	Percentage of non-speaking children within the population

Total Physically- handicapped population	11,876	3%
---	--------------	----

C.P. and Related groups population	4,012	8.7%
---------------------------------------	-------------	------

3. Degree of Physical Involvement of non-speaking population:

	No. of cases	Percentage of Total non- speaking population
Mild.....	18.....	5.3%
Moderate.....	82.....	22.8%
Severe.....	258.....	71.8%
not known.....	1.....	-
Total	359	99.9%

4. Residence

Home.....	312.....	86.9%
Institution.....	47.....	13. %
Total	359	99.9%

5. Education Placement of the reported non-speaking population

A) Public School

(under 5).....	4.....	1.1%
(6 and up).....	7.....	1.9%
Sub-Total	11	3.0%

	No. of cases	Percentage of total non-speaking population
B. <u>Special Education</u>		
a) Treatment Centres (Includes academic and opportunity classes)		
(under 5).....	17.....	4.7%
(6 and up).....	49.....	13.6%
Sub-Total	66	18.3%
b) Opportunity Classes Outside a Treatment Centre		
(under 5).....	0.....	0
(6 and up).....	10.....	2.8%
Sub-Total	10	2.8%
c) Other Special Education (e.g. School for deaf, aphasic settings)		
(under 5).....	6.....	1.7%
(6 and up).....	33.....	9.1%
Sub-Total	39	10.8%
C) <u>Retarded Settings</u>		
(under 5).....	32.....	8.9%
(6 and up).....	93.....	25.9%
Sub-Total	125	34.8%
D) <u>No School</u>		
(under 5).....	34.....	9.4%
(6 and up).....	58.....	16.2%
Sub-Total	92	25.6%
E) <u>Home Instruction</u>		
(no breakdown in age)	3.....	.8%
F) <u>Not known</u>	13.....	3.6%
TOTAL	359	99.7%

	No. of cases	Percentage of Total non-speaking population
6. Pre-School Population (The Education Placement of the reported non-speaking children under 5 years of age)		

Total number of preschoolers - 93

a) Regular Nursery School.....	4.....	4.3%
b) Treatment Centre Nursery School.....	17.....	18.3%
c) Other Spec. Education Nursery School.....	6.....	6.5%
d) Retarded Nursery School....	32.....	34.4%
e) Home.....	34.....	36.6%
Total	<u>93</u>	<u>100.1%</u>

7. Primary Modes of Communication for the 359 children in the reported non-speaking population

a) Symbols (iii).....	28.....	7.8%
b) Gestures (i).....	148.....	41.2%
c) Sign Language.....	9.....	2.5%
d) Pictures.....	12.....	3.3%
e) Written Word Board.....	5.....	1.4%
f) Spelling Board or Typing..	12.....	3.3%
g) Partial Verbalization.....	10.....	2.8%
h) Symbols with another method (ii).....	29.....	8.0%
i) Multi Systems - excluding ones using symbols as one aspect.....	34.....	9.5%
j) None.....	63.....	17.5%
k) Communication Mode not Known.....	9.....	2.5%
	<u>359</u>	<u>99.8%</u>

(i) Gesture included head movement, sounds, crying, hands, eyes, "noises".

(ii) Total symbols (a) & symbols with another method (h) 57....15.8%

(iii) The number of symbol users herein indicated refers to children known to the district nurse to be using symbols from records, May 1974. It does not include physically-handicapped children in large institutions for the mentally retarded. For more recent and direct data (July 1974) collected in conjunction with agreement to participate in a Formative Evaluation of the Ontario Crippled Children's Centre Symbol Communication Programme, funded by the Ministry of Education, the number of reported symbol users in Ontario totals 92.

- (1) Play conversation of Kindergarten Child
- (2) Intermediate Class - examples of utterances
- (3) Combined symbols - created by Intermediate
Class Children
- (4) Examples of Utterances by Advanced Class Children
- (5) "Poem" by child in Advanced Class
- (6) Northwestern Syntax Screening Test

Symbols will appear in the following examples of children's utterances, which have since been amended or replaced. In order to record the children's conversation as it occurred, no corrections have been made.

*Asterisk above a symbol indicates that this use of the symbol differs from examples shown in Semantography or that symbol has been improved through consultation with C.K. Bliss (such symbols now appear on Symbol Stamps).

() Brackets indicate words which were understood -
The Child did not actually point to the symbol.

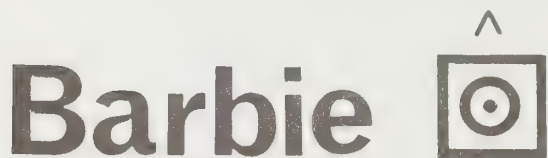
_____ The underlined words are those which explain the
meaning of the component in symbols created by
the child.

Examples including tense markers have not been included at this time until further study has been given to alternative possibilities.

(1) KINDERGARTEN CHILD



Mommy gave (her) to me.



Barbie is sleeping.

(2) INTERMEDIATE CLASS

Two examples of symbol output for each child using 200 Vocabulary

A) Exceptional utterance B) Typical utterance

Child 1. A)



I have (a) treehouse to sleep in.



when (it's) hot.



Dalmation fire dog

Child 2. A)



2

upsets

coming to

Bloorview Hospital
Hospital BV



from

home

Sunday

night

X

B)



Traffic gathering (of) cars

(3) Examples of Combined symbols created by Children using 200 Vocabulary

grandmother



mother #2

tricycle



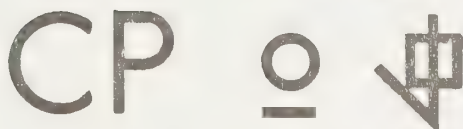
like car,
begins with T

wagon



like car,
begins with W

CP feeder



CP food tool

brave



strong feeling

tooth brush



tooth tool,
opposite of dirty

to pick up



opposite of heavy

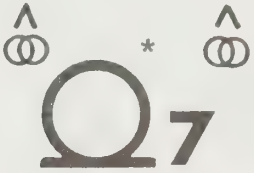
snowmobile



thing (for)
snow like car

(4) ADVANCED CLASS UTTERANCES

Child 1.

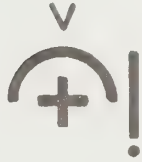
 on  Saturday  I  play  cars(s)

Child 2.

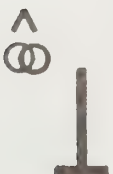
 I  have (a)  girl  friend  named

Ann +  I  love  her  because  (she's) prett

Child 3.

 a  good  man  knocks  similar to fight

 
on (the) door

 The  fire  eater  man(who)eats  comes  out.

+   knocks   him  out

10 9[^] 8 7 6 5 4 3 2 1 }

I'm pretending I'm going on the moon. Blast off!
fire

I'm going here and there and here and

there and here and there

10 9[^] 8 7 6 5 4 3 2 1 }

I'm pretending I'm going home here and there Blast off!

I'm pretending I'm going in the cloud

10 9[^] 8 7 6 5 4 3 2 1 }

I'm pretending I'm going in the weather Blast off!

10 9 8 7 6 5 4 3 2 1 }

-!! X □○

no more story Blast off!

(6). NORTHWESTERN SYNTAX SCREENING TEST

Examples of variety of responses on one item

Northwestern Syntax Screening Test

Expressive

THE DOG IS IN THE BOX

THE DOG IS ON THE BOX

Silvano □ ● ◡

in container

◡ ◡

on container

Kari D π □ B ∪

dog in box container begins with B
animal begins with D

λ3 √ B ∪

he on box container begins with B

Terry D □ ^

D (dog) in (thing which) protects

□ D - ! ^

In (dog) not (thing which) protects

Joey λ3 □ □

he in thing

λ3 √ □

he on thing

ABSTRACT OF ONTARIO CRIPPLED CHILDREN'S CENTRE
RESEARCH STUDY FUNDED BY THE ONTARIO MINISTRY OF
EDUCATION SEPTEMBER 1974 to AUGUST 1976

A Formative Evaluation of The Ontario Crippled Children's
Centre Communication Programme

PURPOSE

To conduct a formative evaluation of the Ontario Crippled Children's Centre Communication Programme by collecting information from instructors in a variety of settings regarding the effectiveness of the symbol system-based on their records of children's symbol performance, their experience with various teaching procedures and their reactions to the Ontario Crippled Children's Centre symbol vocabularies.

POPULATION

Due to the already widespread use of symbols and the heterogeneity between settings, it is not possible to select a control group and utilize experimental design. A formative evaluation will be undertaken involving the entire symbol-using population known to the Ontario Crippled Children's Centre, who are willing to participate. Because of the widespread geographic scattering of symbol users, it is not possible to visit the total population for the purpose of data collection. A sub-population has been selected for direct information gathering. The total population to date includes 44 settings representing 196 children. The sub-population to date includes 16 settings representing 93 children.

MATERIALS

1. cumulative record file (initial description form and progress reports
2. teacher interview form
3. teacher questionnaires (2)
4. parent questionnaire

PROCEDURE

The Ontario Crippled Children's Centre Communication Programme will be field tested in a wide range of settings. Records of children's symbol performance will be kept by a cumulative record file; experience with various teaching procedures and reactions to symbol vocabularies will be obtained through teacher questionnaires and teacher interviews. Parents' reactions to the Communication Programme will be obtained through a parent questionnaire.

PRODUCTS

Standard symbol vocabularies will be produced utilizing the information collected in the study and the consultant services of C.K. Bliss. A handbook will be produced which will be directed toward teachers, parents and administrators. The handbook will contain the standard symbol vocabularies, a description of the total symbol-using population, case histories, symbol instructional procedures and information regarding symbol usage with reference to particular sub-groups within the symbol-using population.

DIRECTIONS FOR FUTURE RESEARCH

Symbols have potential for application beyond the population of physically-handicapped non-verbal children. Future research should be directed toward utilization of symbols by children with communication difficulties resulting from other handicapping conditions such as aphasia, autism, deafness, and mental retardation. The possibility of symbols serving as a preparatory visual medium toward reading and as a substitute visual coding system in remedial reading warrants investigation. Attention should also be given to the application of symbols to all fore-mentioned areas of communication difficulty within the adult population.

September 9th, 1974

Barbara Kates
Shirley McNaughton
Dr. H. Silverman

RESPONSE TO COMMON MISCONCEPTIONS REGARDING
BLISSYMBOLICS AS A COMMUNICATION MEDIUM FOR
NON-SPEAKING PHYSICALLY-HANDICAPPED CHILDREN

STATEMENT ONE:

"Why not teach him to read instead?" If a child is bright enough to learn symbols, it would be better to devote attention to teaching him words which everyone else uses and thus spare the child the time and effort involved in learning two different systems .

RESPONSE ONE:

This argument is based on the following premises:

1. words and symbols are organized in the same way;
2. words and symbols require the same learning abilities;
3. communication facility utilizing each system can be acquired with an equal amount of effort and time;
4. words and symbols fulfil the same function.

However:

1. Written words are composed of visual elements (letters and groups of letters) which are related to sound. Blissymbols are composed of visual elements which are related to meaning -- sometimes directly through pictorial representation; sometimes indirectly through representing an idea related to the meaning; sometimes arbitrarily.
2. When the young child first learns words, he must remember an abstract visual configuration; any clue relating this configuration to other parts of the system are based on sound-shape relationships. When the young child first learns Blissymbols he must remember a pictorial representation which refers by its outline directly to the object it portrays.
3. Communication facility utilizing the word system is dependent upon skill in spelling - for which training and practice is required. Facility utilizing the Blissymbol system is dependent upon the ability to select the meaning elements (essential characteristics) required to transmit meaning - for which the abilities to classify and describe are required.

4. Both systems do indeed share the common function of providing a vehicle for communication; however the degree of communication comprehensiveness of each system which can be acquired by the young child and the additional functions served by each system are different and should be recognized.
 - a. Words prepare the child for reading and typing (the physically-handicapped child's potential written output medium). Words also provide the child with a communication medium which can gradually expand as he masters a growing vocabulary.
 - b. Blissymbols equip the child with a complete communication system (accessible to the bright child within a four to fifteen month period). Blissymbols also provide the child with a medium which facilitates creative thinking, inductive processing and concept clarification. Utilization of the medium involves a conceptual framework which gives the child another perspective in viewing and relating to his world. Blissymbols provide experience in the processing of visual information and thus contribute to learning to read. Incidental experience with words is provided through the child's constant access to the words which appear under each symbol on his display.

In Summary:

Words provide early limited communication which gradually expands; they prepare for reading and typing. Blissymbols provide earlier comprehensive communication and contribute to creativity and cognitive development; they prepare for reading through experience with the process but not directly with the content of the written English system.

STATEMENT TWO:

"Words can do as much as symbols can do". If a child has 100 spaces which can be clearly indicated by him, he will be able to communicate as fully with 100 words in the spaces as he would do with 100 symbols occupying the spaces.

RESPONSE TWO:

This statement fails to recognize the communication potential arising from the structure of the Blissymbol System. Each symbol, whether it be a simple or compound symbol, represents a concept which can encompass a range of meanings and be translated by many words. e.g. The symbol for "building" can be interpreted as house, home, structure, hotel, garage, shack, palace, office, tent, etc., through utilizing information from the situational context or by responding to additional symbol clues.

Secondly, each symbol element can be combined and recombined with other elements to form new concepts.

One hundred symbols can lead to an infinite number of words - as many as the child's creative ability will allow. Only through the ability to spell could the word system provide the same communication potential. It can be argued that a broad meaning can also be taken from individual words and that symbols are not necessary. This can certainly be done by those skilled in relating with the children but it involves mis-using a system which is based upon precision and accuracy of word meaning. One feels that the child is using a rudimentary form of the word system (e.g. pidgin English); whereas with symbols, the child is creatively using a device which is an integral part of the system. The child is indicating a mastery of the symbol system which gains him recognition rather than utilizing an inferior form of the word system which tends to minimize his capabilities as perceived by others.

STATEMENT THREE:

"Symbols emphasize that the child is different and present a negative image to others".

RESPONSE THREE:

Our experience has been just the opposite. When open-minded new-comers meet symbol-using children for the first time, they are intrigued by the uniqueness of the children's communication mode.

They are impressed with the children's ability to relate with others and to communicate unanticipated information. As they become aware of the children's ability to create new symbols and the manner in which the symbol output is integrated with gesture, early alphabet skills and vocalization, most persons become highly motivated to interact with the children and to learn enough about the symbols to communicate at a level which utilizes the many strategies inherent in the structure of the system.

STATEMENT FOUR:

"Symbols restrict the number of persons with whom the children can communicate, for one must know the symbol system before one can understand the children's output.

RESPONSE FOUR:

Not true! One does not have to learn the symbol system in order to communicate with a symbol-using child. A WORD APPEARS UNDER EVERY SYMBOL on the child's display. Those persons who do not have the time or the desire to learn the symbols can communicate at the word level with every symbol-using child. Basic communication is possible with everyone.

STATEMENT FIVE:

"Blissymbols are best suited to serve as a communication medium for the mentally retarded child. The bright child should learn words". OR CONVERSELY "Blissymbols are too difficult for the mentally retarded child; only the child with average or above average intellectual ability should be introduced to the symbols".

RESPONSE FIVE:

There is need for exploration of symbol use by children at differing intellectual levels. The child's intellectual ability will determine the use he makes of the symbols. The child with limited mental ability will require a teaching approach suited to his needs and will limit his communication to basic needs and immediate situations. The brighter child can become involved with the organization and strategies of the system and can

become proficient at communicating at various levels, dependent upon the symbol expertise of the person with whom he is communicating. Inherent in the Blissymbol system is a complex, comprehensive, creative communication potential, (the details of which are outlined in C.K. Bliss' text Semantography - Blissymbolics, Semantography-Blissymbolics Publications, which can serve the symbol-user into adulthood, should he wish to continue an involvement with the system!

STATEMENT SIX:

"Blissymbols are only useful as a bridge to reading".

RESPONSE SIX:

Blissymbols do provide an excellent preparation for learning to read (see response number 1). They are however, components of an independent communication medium and deserve recognition in this capacity. The symbol system, Blissymbolics, contains an organization and structure which makes it a valuable communication medium with potential application to a wide range of children and adults with communication difficulties.

BY: Shirley McNaughton, Director
Symbol Communication Programme
Ontario Crippled Children's
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APPENDIX E

SURVEY OF SYMBOL-USING CHILDREN

JUNE 1974

This preliminary survey of Ontario Crippled Children Symbol Communication Programme users was conducted for the purpose of obtaining information re the present extent and effect of symbol communication for non-speaking physically-handicapped children.

I. SURVEY RESPONSE

Total number of settings invited to participate....60
Total number of settings responding40
Percentage of responding settings to total.....
 number of settings invited.....66%
Total number of symbol-using children reported.....150

II. TOTAL NUMBER OF SYMBOL-USING CHILDREN REPORTED

Age levels of symbol-using children:

0-5 yrs.....	14.....	9.3%
6-12 yrs.....	83.....	55.33%
Teen.....	40.....	26.66%
20 yrs. & over..	12.....	8.00%
not stated.....	1.....	.66%
Total	150	99.98%

III. LENGTH OF TIME ON SYMBOLS: of symbol-using children

(i) 6 mos. & under.....	59.....	39.33%
(ii) over 6 mos., under 1 yr....	54.....	36. %
(iii) 1 yr. to 1 yr. 11 months...	30.....	20. %
(iv) 2 yrs. & over.....	6.....	4. %
(v) not stated.....	1.....	.66%
Total	150	99.99%

IV. DEGREE OF DISABILITY: of symbol-using children

(i) mild.....	5.....	3.33%
(ii) moderate.....	40.....	26.66%
(iii) severe.....	54.....	36. %
(iv) needs electronic equipment .	47.....	31.33%
(v) using electronic equipment .	3.....	2. %
(vi) not stated.....	1.....	.66%
Total	150	99.98%

V. VOCABULARY LEVEL: of symbol-using children

(i)	30 symbols & under.....	23.....	15.33%
(ii)	31-99 symbols.....	38.....	25.33%
(iii)	100-199 "	39.....	26. %
(iv)	200-399 "	19.....	12.66%
(v)	400-& over	30.....	20. %
(vi)	not stated	1.....	.66%
Total		150	99.98%

VI. LEARNING CAPABILITY: of Symbol-using children
as described by teacher

(i)	Trainable retarded -drill.	36.....	24. %
(ii)	Trainable retarded - learns quickly	29.....	19.33%
(iii)	slow learner.....	26.....	17.33%
(iv)	average.....	16.....	10.66%
(v)	learns quickly.....	42.....	28. %
(vi)	not stated.....	1.....	.66%
Total		150	99.98%

VII. PROGRAMME PLACEMENT OF SYMBOL USING CHILDREN

(i)	retarded.....	58.....	38.66%
(ii)	opportunity.....	6.....	4. %
(iii)	academic.....	80.....	53.33%
(iv)	other.....	3.....	2. %
(v)	no programme.....	3.....	2. %
Total		150	99.99%

VIII. MAXIMUM UTTERANCE LENGTH: of symbol-using children

(i)	1 symbol.....	26.....	17.33%
(ii)	2 "	24.....	16. %
(iii)	3 "	22.....	14.66%
(iv)	4 " & over.....	66.....	44. %
(v)	not stated.....	12.....	8. %
Total		150	99.99%

IX. LEVEL OF SYMBOL OUTPUT: of symbol-using children

(i) 1 single symbol.....	25.....	16.66%
(ii) 2 or 3 symbols (not sentence form).....	46.....	30.66%
(iii) single sentence.....	23.....	15.33%
(iv) full syntax.....	3.....	2. %
(v) random order, over 3 symbols	1.....	.66%
(vi) type not stated (*).....	52.....	34.66%
Total	150	99.97%

X. PARENTAL ATTITUDE

(i) opposed to symbols.....	1.....	.66%
(ii) no support.....	20.....	13.33%
(iii) some support.....	65.....	43.33%
(iv) strong support.....	29.....	19.33%
(v) not applicable.....	33.....	22. %
(vi) not stated.....	2.....	1.33%
Total	150	99.98%

XI. TEACHERS RATING OF SYMBOL-USING CHILDREN'S COMMUNICATION ABILITY

(i) excellent.....	20.....	13.33%
(ii) good.....	42.....	28. %
(iii) fair.....	60.....	40. %
(iv) poor.....	27.....	18. %
(v) not stated.....	1.....	.66%
Total	150	99.99%

XII. TEACHERS RATINGS OF VOCALIZATION CHANGE IN SYMBOL-USING CHILDREN

(i) less vocalization.....	2.....	1.33%
(ii) no change.....	94.....	62.66%
(iii) some improvement.....	36.....	24. %
(iv) marked improvement.....	9.....	6. %
(v) not stated.....	9.....	6 %
Total	150	99.99%

(*) This question had a low response due to the inadvertant omission of the symbol level summary sheet which should have accompanied the questionnaire.

XIII. USE OF THE ALPHABET BY SYMBOL-USING CHILDREN

Yes.....	65.....	43.33%
No.....	82.....	54.66%
Not stated.....	3.....	2. %
Total	150	99.99%

XIV. ARE SYMBOLS USED BY THE CHILD AS A SUBSTITUTE OR COMPLIMENT TO ANOTHER MODE OF COMMUNICATION?

(i) substitute.....	117.....	78. %
(i) compliment.....	31.....	20.66%
not stated.....	2.....	1.33%
Total	150	99.99%

XV. CHILDREN WITH WHOM SYMBOLS WERE ASSESSED AS INEFFECTIVE

a) Total number of children - 18

b) Age distribution of children for whom symbols were ineffective

Under 5.....	5.....	27.77%
6-12 years.....	2.....	11.11%
Teen.....	-	-
20 & Over.....	1.....	5.55%
Not stated.....	10.....	55.55%
Total	18	99.98%

c) Teacher evaluation of cause of failure

	CHILD NO.																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
i) Auditory visual problems									X									
ii) Retardation	X	X	X					X	X									
iii) Degree of involvement										X						X		
iv) Learning problems	X	X	X				X				X						X	
v) Behaviour - emotional					X												X	X
vi) Too young	X	X	X	X														
vii) Not stated					X	X						X	X	X	X			

DISCUSSION OF FINDINGS

From the 66% response of the questionnaire, information is given for 150 children. Of this number, 55% are between ages 6 and 12; 27% are in their teens. The use of symbols with the kindergarten and pre-kindergarten child and with adults is minimal and remains an important area for future exploration.

The population of reported symbol users is still a very new one with 75% of the children having spent less than 1 year with symbols. Few mildly disabled children are receiving instruction. At the present time, 27% are moderately involved children; 36% are described as severely involved but able to indicate symbols without using an electronic display. Thirty-one percent of the total population require electronic equipment; this points out the need for attention continuing to be directed toward setting up the means of production of communication technical aids and for further research into interface alternatives.

Information regarding advanced symbol usage remains to be discovered. At the present time, the majority of children 67% are using under 200 symbols with the maximum utterance length reported as 3 symbols or more for 59% of the children.

It may prove helpful to summarize the remainder of the results by giving a general description of the symbol-using population. Seventy-eight per cent of the children use symbols as a substitute for speech rather than as a compliment to speech. In over half the cases (63%) no change is apparent, in their vocalization, but improvement has been noticed for 30% of the children. (It is reassuring to note that a decrease in vocalization was reported for only 2 children). The teachers' ratings of children's communication ability follows a normal distribution, with most of the children (68%) being rated as good or fair, and small numbers rated as excellent or poor. Parents generally support the programme. Only 13% give no support and only 1 parent is reported as opposing the use of symbols. Regarding academic placement, the larger number of children are reported in either settings for retarded (39%) or in academic programmes (53%). It is particularly interesting to note that within the population of symbol-using children located in institutions for retarded, (43% of total

symbol-using population), 44% of these children are reported by their instructors as learning symbols quickly - a characteristic not usually ascribed to the "retarded" child! With regard to use of the alphabet, a sufficient number of symbol-using children are reported as using the alphabet (43%) to indicate that instructors are finding ways of continuing reading instruction and/or utilizing the alphabet to refine communication. This is an interesting area for further investigation and development.

Little information is available regarding children with whom symbols have been ineffective. Of the 18 children reported as failing to learn the symbols, reasons were not stated for 6 of the children. When reasons were stated, several factors usually were given as contributing to the failure, among them - retardation, learning-problems, age (see Item 14). More detailed information should be sought regarding reasons for failure in the future.

Although this first survey is limited in the amount of information it has been able to collect and organize, it has been valuable in defining the extent of symbol usage, in providing preliminary information regarding the effect of symbol usage, and in indicating areas for further development and exploration. A two-year Formative Evaluation funded by the Ontario Ministry of Education and undertaken by the O.C.C.C. Symbol Communication Programme, September 1974 to August 1976, will continue studying symbol communication in many settings. One of its objectives will be the production of a Handbook for teachers, parents and administrators. Through the collective experience of many instructors, it is hoped that a body of knowledge re Symbol Communication can be made available to all potential symbol users.

Shirley McNaughton, Director
Ontario Crippled Children's Centre,
Symbol Communication Research Project.

APPENDIX F

0	1	2	3	4	5	6	7	8	9
hello, goodbye	question	I, me (my)	like	happy	do, make action	food	pen, pencil	friend	animal
please	why	you (your)	want	angry	mouth	drink	paper, page	GOD	bird
thanks	how	man	come	afraid	eye	sleep	book	house	flower
I'm sorry	who	woman	give	funny	legs	toilet	table	school	water
1	what	father	make	good	hand	pain	television	hospital	sun
opposite	what	mother	help	big	ear	clothing	news	store	weather
	which								
music	where	brother	think	young, new	nose	outing	word	show	day
when	sister	know	difficult	head	car	light	room	week-end	
how many	teacher	wash	hot	name	wheelchair	game, toy	street	birthday	

SEMANTOGRAPHY-BLISSYMBOLICS

For the initial inspiration and symbol source for the symbols referred to herein, see the text Semantography-Blissymbolics by C.K. Bliss. Many of the symbols and procedures used herein have however been independently amended or conceived, for use in a teaching program for non-communicative children, by the writer or the staff of the Ontario Crippled Children's Centre, Toronto and in many cases may not be in accordance with the Bliss system. For authoritative reference to the Bliss system or copies of the Bliss text, write to Blissymbolics Publications, 2 Vicar Street, P.O. Box 222, Coogee, 2034 Sydney, Australia.

ONTARIO CRIPPLED CHILDREN'S CENTRE
SYMBOL COMMUNICATION RESEARCH PROJECT

100 VOCABULARY MARCH 1974

Revised December 1974

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For the initial implementation, the following steps are suggested:

1. Develop a working prototype, using a 6000 series computer, for the study area problem.
2. Develop a working prototype, using a 6000 series computer, for the study area problem.
3. Develop a working prototype, using a 6000 series computer, for the study area problem.

These steps are suggested as a guide to the development of a working prototype. The first step is to develop a working prototype, using a 6000 series computer, for the study area problem. The second step is to develop a working prototype, using a 6000 series computer, for the study area problem. The third step is to develop a working prototype, using a 6000 series computer, for the study area problem.

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